

Heat Rejection for Dense Compute in Sunlit Low Earth Orbit and on the Martian Surface: Radiation, Convection and Conduction Compared

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KEYWORDS	heat rejection; radiator; view factor; low Earth orbit; Mars surface; convection in CO ₂ ; regolith conduction; data centre thermal control

Abstract

This memorandum compares steady-state heat rejection for dense computing loads in sunlit low Earth orbit and on the Martian surface. In orbit, a nadir-facing radiator at 80 °C nets $\approx 549 \text{ W/m}^2$ and at 20 °C only $\approx 142 \text{ W/m}^2$, because Earth fills 85 % of its view; a two-sided plate rejects $\approx 1,325 \text{ W/m}^2$ at 80 °C. Held edge-on to the Sun and to Earth, each face sees Earth over 26 % of its view and the plate rejects 1,414–1,445 W/m^2 , 5–7 % more. Radiator systems weigh $\approx 9 \text{ t}$ per megawatt of heat (5–19). On Mars, a face-up radiator at 80 °C nets 739–751 W/m^2 under a clear night sky and 648–696 W/m^2 in a global dust storm, a cleaner radiating environment than the orbital nadir face. Passive convection into the thin CO₂ atmosphere is small at radiator scale: $\approx 0.3\text{--}0.8 \text{ W/m}^2\text{K}$ for a one-metre panel. It contributes $\approx 9 \%$ of the rejected heat, not the half assumed in the superseded white paper. Fan-blown finned heat exchangers can reach $\approx 900 \text{ W/m}^2$ per footprint area at $\approx 1\text{--}4 \%$ fan power. Conduction into regolith is negligible. Per unit of radiator plate, orbit rejects 1.7–1.8 $\times$ more heat than a Martian surface panel, up to 2.0 $\times$ with the plate held edge-on.

Summary

Premise. This memorandum concerns heat-rejection environments only. It makes no claim about any power source; no magnetic-confinement fusion device has produced more fusion energy than the heating power applied to its plasma.

Question. Where is it physically easier to reject the heat of a dense computing load: in sunlit low Earth orbit, or on the Martian surface?

Method. Steady-state radiative balance with view factors to Earth and to the Martian sky; flat-plate natural and forced convection in CO₂ at Martian surface conditions with NIST gas properties; one-dimensional conduction into regolith. All values generated by one calculation script.

Results. Orbit: the radiator must run hot, because at 20 °C the nadir face nets only $\approx 142 \text{ W/m}^2$. Holding the plate edge-on to Earth gains 5–7 % at 80 °C and does not change that. Radiator systems weigh $\approx 9 \text{ t}$ per MW of heat. Mars: the upward-facing sky is cold and free of a planet in view, so a face-up panel at 80 °C nets 1.36× the orbital nadir face on a clear night and 1.18× in a dust storm; the warm ground, the Sun and reflected sunlight sit in the lower hemisphere and can be shielded.

Negative results. Passive convection on Mars does not provide a meaningful cooling channel for radiator-sized surfaces; the superseded white paper overstated it by a factor of 10–20. Per unit of plate, a two-sided orbital radiator rejects more heat than a face-up Martian panel, so the Martian advantage is a cleaner, controllable sky and the option of powered heat exchangers, not lower radiator mass per watt. Regolith conduction is not a heat sink.

Nomenclature

σ	Stefan–Boltzmann constant, $5.670 \times 10^{-8} \text{ W m}^{-2} \text{ K}^{-4}$
ϵ, α	radiator infrared emissivity, solar absorptivity
T_r, T_E, T_{sky}	radiator, Earth effective, Martian sky effective temperature, K
F_E	view factor from a nadir-facing plate to Earth
F_v	view factor to Earth from each face of a plate whose plane contains the nadir direction
q	heat flux per unit area, W/m^2
h	convective heat-transfer coefficient, $\text{W m}^{-2} \text{ K}^{-1}$
L, U	plate length in the flow direction, m; wind speed, m/s
k	thermal conductivity, $\text{W m}^{-1} \text{ K}^{-1}$
LEO	low Earth orbit, here 550 km circular
HX	heat exchanger

1. Introduction

A common assumption holds that space is cold and cooling is therefore easy. In vacuum a hot object can lose heat only by radiation, governed by the fourth power of temperature and reduced by whatever the radiator sees. This memorandum quantifies the steady-state heat budget of a computing load in sunlit low Earth orbit and on the Martian surface, and identifies which physical channels are available in each.

Scope. Heat loads of 20 kW to 1 MW; a flat radiator at 20–97 °C; circular orbit at 550 km; an equatorial surface site on Mars.

Excluded. The power source. Transient behaviour. Micrometeoroid protection design. Coating degradation over time. Any statement about when either architecture is built.

Relation to the white paper of June 2026. This memorandum restates *The Cooling Inversion* v001 in the organisation's technical memorandum format, with its sources replaced by primary ones and its numbers recomputed. Five corrections result; they are listed in the Revision Record. The largest concerns Martian convection (Section 4.5).

2. Method

$$q_{emit} = \varepsilon \sigma T_r^4 \quad (1)$$

$$q_{net} = \varepsilon \sigma T_r^4 - [\varepsilon \sigma F T_{env}^4 + \alpha (F q_{albedo} + q_{solar} \cos \theta)] \quad (2)$$

$$F_E = \sin^2 \rho, \quad \rho = \arcsin[R_E / (R_E + h)] \quad (3)$$

$$F_v = (\rho - \sin \rho \cos \rho) / \pi \quad (3b)$$

$$A = Q / q; \quad m_{rad} = A \cdot m_{areal} \cdot k_{sys} \quad (4)$$

$$q_{conv} = h (T_r - T_{air}); \quad q_{cond} = k \Delta T / L \quad (5)$$

Equation (2) is the net radiative flux from one face of a radiator that sees a body of effective temperature T_{env} over view factor F and receives reflected and direct sunlight. By Kirchhoff's law the infrared absorptivity equals ε ; the solar absorptivity α is a separate surface property [3]. Equation (3) is the view factor from a flat nadir-facing plate to a spherical Earth. Equation (3b) is the view factor from each face of a plate held edge-on to Earth, its plane containing the nadir direction; it follows from integrating the cosine-weighted solid angle of the Earth disc over the half of it in front of each face, and the calculation script checks it by numerical quadrature. Convective coefficients follow textbook flat-plate correlations (laminar forced convection, $Nu = 0.664 Re^{1/2} Pr^{1/3}$; face-up natural convection; mixed-convection blending) evaluated with NIST properties of CO_2 at 600 Pa and 210 K [14] [15]. These are the same routines as the organisation's internal report 055.

3. Assumptions

1. **A1.** Radiator coating: $\varepsilon = 0.88$, $\alpha = 0.15$, typical of second-surface silvered FEP tape and white paint, which combine low solar absorptivity with high infrared emissivity [3]. The numerical values are an estimate; ε is swept 0.80–0.92 in Section 5. [E]
2. **A2.** Circular orbit at 550 km, radiator plate facing nadir and zenith. Second attitude: the plate held edge-on to the Sun and to Earth, its plane containing the Sun and nadir directions, both faces radiating. [A]
3. **A3.** Solar irradiance 1,361 W/m², Earth Bond albedo 0.294 and effective temperature 254.0 K [1]. The white paper used 0.30 and 255 K; both are shown. [M]
4. **A4.** Radiator panel areal mass 8 kg/m² (5–10), lightweight panels 1.6–3.9 kg/m², system multiplier 1.55 (1.4–1.7) for loops, pumps, structure and micrometeoroid shielding. [E]
5. **A5.** Planning area per 20 kW: 15 m² (favourable attitude) to 22 m² (unfavourable). [E]
6. **A6.** Coolant loop: water c_p 4,186 J kg⁻¹ K⁻¹ with a 20 K rise [P]; ammonia latent heat 1,370 kJ/kg at –33 °C, 1,186 at 20 °C and 874 at 80 °C [14]. [M]
7. **A7.** Martian sky effective temperature 150–165 K on a clear night and 200–225 K in a global dust storm, inferred from the reported nightside surface warming during the 2018 storm [8]. [E]
8. **A8.** Daytime loads on an upward-facing panel: 52 W/m² absorbed from a dusty day sky with the Sun shielded; direct Sun $\alpha \times 590$ W/m² = 88 W/m² at the clear-sky peak [4]; ground-reflected sunlight ≤ 22 W/m². [E]
9. **A9.** Near-surface air 210 K at 600 Pa CO_2 ; mean surface temperature 214 K and pressure 6.36 mbar [2]. [M]

10. **A10.** Dry regolith thermal conductivity $0.039 \text{ W m}^{-1} \text{ K}^{-1}$, measured by InSight [7]; contact layer 0.1 m; ΔT 50 K. [M]
11. **A11.** Field-scale convective coefficient for a Martian radiator $0.5 \text{ W m}^{-2} \text{ K}^{-1}$ (0.2–1.0), from the metre-scale flat-plate results of Table 5 and the field-scale value implied by Curiosity's surface energy budget [9]. [C]
12. **A12.** Earth–Mars comparisons are per unit radiator area at equal radiator temperature. [A]

! ESTIMATE — The radiator areal masses of A4 are engineering estimates not verified against a primary source in this revision. They set the t/MW results of Table 3, not the heat-flux results.

4. Results

4.1 Radiative emission

Table 1. Emitted flux per unit area.

Radiator temperature	$\epsilon = 1, \text{ W/m}^2$	$\epsilon = 0.88, \text{ W/m}^2$	Tag
20 °C (293.15 K)	419	369	[P]
80 °C (353.15 K)	882	776	[P]
97 °C (370.15 K)	1,064	937	[P]

Source: calculated, this document [15], equation (1).

Raising the radiator from 20 °C to 80 °C more than doubles the emitted flux [P]. Radiator temperature is the dominant design lever in vacuum.

4.2 The orbital nadir face

Table 2. Heat budget of a nadir-facing radiator at 550 km, sunlit arc.

Quantity	Central (A3)	White paper inputs	Tag
Earth angular radius ρ ; view factor F_E	67.0°; 0.847	same	[C]
Earth infrared absorbed, $\epsilon F_E \sigma T_E^4$	176 W/m ²	179 W/m ²	[C]
Reflected sunlight absorbed, $\alpha F_E a S$	51 W/m ²	52 W/m ²	[C]
Net rejection at 80 °C	549 W/m²	545 W/m ²	[C]
Net rejection at 20 °C	142 W/m²	138 W/m ²	[C]
Two-sided plate at 80 °C (zenith + nadir)	1,325 W/m ²	1,322 W/m ²	[C]

Source: calculated, this document [15], equations (2) and (3), inputs [1].

At 20 °C the nadir face keeps only about a quarter of its emission, because Earth fills 85 % of its view [C]. High radiator temperature is a requirement in orbit, not an optimisation.

Table 2a. Two-sided plate at 550 km in two attitudes, edge-on to the Sun in both; central inputs (A3).

Quantity	Nadir/zenith plate	Plate edge-on to Earth	Tag
View factor to Earth, per face	0.847 (nadir face); 0 (zenith face)	0.258 (each face)	[C]
Earth infrared absorbed, per face	176; 0 W/m ²	54 W/m ²	[C]
Reflected sunlight absorbed, per face, full sunlit value	51; 0 W/m ²	15 W/m ²	[C]
Net per plate area at 80 °C, full reflected light	1,325 W/m ²	1,414 W/m²	[C]
Net per plate area at 80 °C, no reflected light	1,376 W/m ²	1,445 W/m²	[C]
Net per plate area at 20 °C, full / no reflected light	510 / 561 W/m ²	599 / 630 W/m ²	[C]

Source: calculated, this document [15], equations (2), (3) and (3b), inputs [1].

Held edge-on, each face sees Earth over 26 % of its view instead of 85 % for the nadir face, yet the plate gains only 5–7 % at 80 °C and 12–17 % at 20 °C under the same reflected-light assumption [c]: the zenith face of the nadir/zenith plate already sees deep space, so the edge-on attitude trades one poor and one ideal face for two intermediate ones. Reflected sunlight is bracketed between the full sunlit value and zero; a plate above the day–night line, as in a dawn–dusk orbit, receives little. At 20 °C the edge-on plate still rejects less than half of its value at 80 °C [c]; the attitude does not remove the need to run hot.

4.3 Radiator area and mass in orbit

Table 3. Radiator area and system mass at 80 °C.

Case	Value	Tag
20 kW, both faces into deep space (optimistic)	12.9 m ²	[C]
20 kW, nadir/zenith plate	15.1 m ² (planning 15–22)	[C]
100 kW, nadir/zenith plate	75 m ² (planning 75–110)	[C]
1 MW: area	754–1,100 m ²	[C]
1 MW: system mass at 8 kg/m ² , multiplier 1.4–1.7	8.5–10.3 t	[C]
1 MW: central (8 kg/m ² , 1.55)	9.4 t	[C]
1 MW: band over A4 and A5	5.3–18.7 t	[E]
1 MW, plate edge-on to Earth: area	692–707 m ²	[C]
1 MW, plate edge-on to Earth: central mass	8.6–8.8 t	[C]
1 MW: lightweight panels 1.6–3.9 kg/m ²	1.7–7.3 t	[E]

Source: calculated, this document [15], equation (4), inputs A4–A5.

The white paper stated 10–12 t/MW; its own formula gives 8.5–10.3 t, and its lightweight figure of 6–8 t/MW should read 1.7–7.3 t [c]. Both errors overstated orbital radiator mass.

4.4 Coolant transport

Table 4. Coolant mass flow to move 100 kW.

Loop	Mass flow, kg/s	Relative to water	Tag
Single-phase water, 20 K rise	1.19	1	[C]
Two-phase ammonia at 20 °C	0.084	1/14	[C]
Two-phase ammonia at 80 °C	0.114	1/10	[C]
Two-phase ammonia at −33 °C (value used by the white paper)	0.073	1/16	[C]

Source: calculated, this document [15], latent heats from [14].

At loop temperatures of 20–80 °C, two-phase ammonia cuts the mass flow by a factor of 10–14, not 16 [C]. A heat pump that lifts the rejection temperature adds its own work as heat to be rejected; raising the tolerated electronics temperature is the effective lever [P].

4.5 Convection on the Martian surface

Table 5. Convective heat-transfer coefficient in Martian air (600 Pa CO₂, 210 K, surface 60 K warmer).

Surface and flow	h, W m ² K ^{−1}	Tag
1 m plate, natural convection, face up	0.26	[C]
1 m plate, wind 0.5 m/s	0.29	[C]
1 m plate, wind 4 m/s	0.52	[C]
1 m plate, wind 10 m/s	0.79	[C]
1 m plate, wind 25 m/s (dust storm)	1.24	[C]
0.1 m plate, wind 4 m/s	1.6	[C]
2 cm element, wind 4 m/s	3.6	[C]
4 mm element, wind 4 m/s	8.7	[C]

Source: calculated, this document [15] with NIST CO₂ properties [14]; same routines as internal report 055.

The white paper stated $h \approx 3.5$ W/m²K at 0.5 m/s rising to ≈ 9 at 4 m/s. For a one-metre radiator the correct values are 0.29 and 0.52 [C]; values of 3.5–9 occur only on elements a few millimetres to a few centimetres long, such as wind-sensor rods [12] [M]. Independent results agree at radiator scale: a computational study of a 0.65 m rover plate at 15 m/s gives 1.4–1.8 [10], a full-scale model of a radioisotope generator in still Martian air gives 0.16–0.24 [11], and Curiosity's measured surface energy budget limits sensible heat loss to 18–38 W/m² [9] [M]. With the field-scale value $h = 0.5$ (A11), convection adds 72 W/m² (29–143) to a panel at 80 °C, 9 % of its rejection [C].

Forced air through a finned or tube heat exchanger behaves differently: with millimetre passages the per-footprint rejection reaches ≈ 930 W/m² at a 60 K difference, at a fan power of ≈ 1 –4 % of the heat moved for mass-competitive designs [13][15] [C]. This is an engineered, powered channel; it has not been demonstrated at scale under Martian conditions, and dust fouling of the passages is not quantified.

! CORRECTION — The superseded white paper credited passive Martian convection with a coefficient 10–20 times too high. Its statement that the Martian advantage "lives in the air" holds only for powered heat exchangers.

4.6 Radiation on the Martian surface

Table 6. Net rejection of a face-up radiator at 80 °C on Mars (emission 776 W/m²).

Condition	Absorbed, W/m²	Net, W/m²	Tag
Night, clear sky (150–165 K)	25–37	739–751	[C]
Night, global dust storm (200–225 K)	80–128	648–696	[C]
Day, Sun shielded, dusty sky	52	724	[E]
Day, Sun exposed	52 + 88 + 22	614	[E]

Source: calculated, this document [15], inputs A7–A8 [4][8].

On a clear night the Martian panel nets 1.36× the orbital nadir face, and 1.18× in a global dust storm [C]. The white paper gave 690–725 W/m² for the dust-storm case; with its own stated sky temperature of 200–225 K the value is 648–696 [C]. The warm ground, the Sun and ground-reflected light act on the lower hemisphere and can be shielded; Earth in the orbital case fills the radiating hemisphere and cannot.

4.7 Conduction into regolith

Through a 0.1 m layer at a 50 K difference, regolith conducts 19.5 W/m², about 51 m² of contact per kilowatt, and the surrounding soil saturates within hours without a convective refresh [C]. Regolith is a slow thermal buffer, not a steady-state sink [7].

4.8 Comparison

Table 7. Sunlit orbit and Martian surface compared (80 °C radiator, $\epsilon = 0.88$).

Property	Sunlit LEO	Martian surface	Tag
Solar power available	1,361 W/m², continuous in the sunlit arc [1]	≈ 590 W/m² clear-sky peak [4]; 586 W/m² mean at the top of the atmosphere [2]; 96.7 % array loss in the 2018 storm [5]	[M]
Radiating face, net	nadir 549 W/m², Earth in view, not shieldable	face-up 739–751 (clear night), 648–696 (dust storm), 724 (day, shielded)	[C]
Radiator plate, net per plate area	1,325 W/m² (two faces); 1,414–1,445 held edge-on	≈ 796 W/m² (one face plus convection)	[C]
Passive convection	none	$h \approx 0.3\text{--}0.8$; ≈ 9 % of rejection	[C]
Powered convection	none	≈ 900 W/m² per footprint with a finned HX at 1–4 % fan power; not demonstrated at scale	[C]
Conduction sink	none	negligible (19.5 W/m²)	[C]
Binding limit	radiator area, temperature and mass	power continuity through night and dust storms	[E]

Source: calculated, this document [15]; references as cited in the table.

5. Sensitivity

Table 8. Effect of each input on the results, ranked.

Input	Range	Effect	Tag
Radiator temperature	20–97 °C	orbital nadir net 142 → above 549 W/m ² ; the dominant lever	[C]
Radiator attitude	nadir/zenith → edge-on to Earth	per-plate net +5–7 % at 80 °C, +12–17 % at 20 °C	[C]
Radiator panel areal mass and attitude	1.6–10 kg/m ² , 15–22 m ² per 20 kW	orbital radiator mass 1.7–18.7 t/MW	[E]
Martian convective coefficient	0.2–1.0 W m ⁻² K ⁻¹	convective share 4–17 % at 80 °C	[C]
Martian sky temperature	150–225 K	face-up net 648–751 W/m ² at 80 °C	[C]
Earth albedo and effective temperature	0.294–0.30; 254–255 K	nadir net 545–549 W/m ² at 80 °C	[C]
Coolant loop temperature (ammonia)	–33 to 80 °C	flow reduction versus water 10–16×	[C]

Source: calculated, this document [15].

Emissivity scales every radiative flux in proportion: ε from 0.80 to 0.92 changes the emitted flux at 80 °C from 706 to 811 W/m² [C].

6. Discussion

Sunlit orbit offers continuous solar power but only one way to reject heat: radiation, with Earth filling most of the view of the downward face. Holding the radiator edge-on to Earth cuts Earth's share of each face's view to about a quarter but gains only 5–7 % at 80 °C. Radiators there must run hot, and at the megawatt scale their mass becomes a first-order item.

The Martian surface reverses the power situation: sunlight is weaker, interrupted by night and cut almost entirely by global dust storms. Its thermal environment is cleaner rather than richer. An upward-facing radiator sees a cold sky with no planet in view, and the warm ground and the Sun can be screened. The thin atmosphere adds little by itself; it becomes useful only when air is driven through a heat exchanger by fans, which costs power and has not been demonstrated at scale.

Per unit of radiator plate, a two-sided orbital panel rejects more heat than a face-up Martian panel. The surface case therefore does not lower radiator mass per watt. It offers a radiating environment that is cleaner, can be shielded and does not depend on attitude control, plus the option of powered heat exchangers.

The binding limit on the surface is continuous power through night and dust storms. A dust-independent power source closes that gap. NASA selected fission for crewed Mars surface power in December 2024 [6]. Whether fusion becomes the lighter option at large scale is examined, conditionally, in FUNNY-TM-2026-001.

7. Limitations

1. Radiator coating properties and panel areal masses are estimates (A1, A4); areal mass is not verified against a primary source in this revision.
2. The Martian sky temperatures are inferred from reported surface warming [8], not measured directly.

3. Orbital results cover two fixed attitudes of a flat plate in the sunlit arc, nadir/zenith (Table 2) and edge-on to the Sun and to Earth (Table 2a). Reflected sunlight is bracketed between its full sunlit value and zero, not followed along the orbit. Eclipse and attitude transients are not modelled.
4. Convective coefficients use textbook correlations with a +30 % allowance for turbulence at the upper edge (internal report 055); no metre-scale measurement on Mars exists.
5. The fan-blown heat exchanger values are modelled designs [13]; measured pressure drops at low density exceeded the correlations, so real fan power is likely higher. Dust fouling is not quantified.
6. No transient, degradation or micrometeoroid analysis; no statement about any power source's feasibility.
7. No external review of this revision.

8. Conclusions

1. In sunlit LEO a nadir-facing radiator nets $\approx 549 \text{ W/m}^2$ at 80°C and $\approx 142 \text{ W/m}^2$ at 20°C ; high radiator temperature is a requirement (Table 2).
2. Held edge-on to the Sun and to Earth, a two-sided plate rejects $1,414\text{--}1,445 \text{ W/m}^2$ at 80°C , 5–7 % more than the nadir/zenith plate; it still must run hot (Table 2a).
3. Orbital radiator systems weigh $\approx 9 \text{ t}$ per megawatt of heat (5–19), not the 10–12 t stated in the white paper (Table 3).
4. A face-up Martian radiator at 80°C nets $739\text{--}751 \text{ W/m}^2$ on a clear night and $648\text{--}696 \text{ W/m}^2$ in a global dust storm (Table 6).
5. Passive convection on Mars contributes $\approx 9 \%$ of a radiator's rejection; the white paper's coefficient was 10–20 times too high (Table 5).
6. Powered, finned heat exchangers can reach $\approx 900 \text{ W/m}^2$ per footprint at a few per cent fan power, not yet demonstrated at scale (Section 4.5).
7. Regolith conduction is negligible (Section 4.7).
8. Per unit of plate, orbit rejects $1.7\text{--}1.8\times$ more heat, up to $2.0\times$ held edge-on; the Martian advantage is a cleaner, shieldable sky, not lower radiator mass (Table 7).
9. The binding surface limit is power continuity, which dust-independent power sources address (Section 6).

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Revision Record

Revisions.

Rev	Date	Change	Author
(white paper v001)	2026-06-22	Original white paper <i>The Cooling Inversion</i> , brand format. Kept unchanged for the record.	E. Lupo; D. Wolf
A (v1.0)	2026-09-27	Restated in technical memorandum format; sources replaced by primary ones and archived; all numbers recomputed by a published script. Corrections against the white paper: (1) Martian convective coefficient 3.5–9 → 0.29–0.79 W/m ² K for a 1 m panel (internal report 055); the claim that the Martian advantage "lives in the air" is withdrawn for passive radiators. (2) Radiator mass 10–12 → 9.4 t/MW central; lightweight 6–8 → 1.7–7.3 t/MW. (3) Dust-storm night net 690–725 → 648–696 W/m ² . (4) Ammonia flow reduction 16× → 10–14× at loop temperature. (5) Discussion restated: per plate, orbit rejects more heat; the surface power gap is closed by any dust-independent source, not by fusion specifically. Orbital nadir values 545/138 W/m ² reproduce; with NASA reference inputs they are 549/142.	E. Lupo; D. Wolf
B (v1.1)	2026-10-23	Calculation of record and convection module cited by their published names and addresses [15]; comments of the published scripts reworded. No number changed.	E. Lupo; D. Wolf
C (v1.2)	2026-10-24	Second orbital attitude added: plate held edge-on to the Sun and to Earth, both faces radiating (equation 3b, assumption A2, Table 2a, rows in Tables 3, 7 and 8, Discussion, Limitation 3, Conclusions 2 and 8). Per-plate net at 80 °C 1,414–1,445 W/m ² , 5–7 % above the nadir/zenith plate. No earlier number changed.	E. Lupo; D. Wolf

Source: document control; internal report 055.